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A New Dextral Flounder, *Poecilopsetta macrocephala* (Pisces: Pleuronectiformes: Poecilopsettidae), from Northwestern Australia

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A new species of poecilopsettid flounder, *Poecilopsetta macrocephala*, is described based on seven specimens from 550–555 m depth on the continental slope off northwestern Australia. This species resembles *P. vaynei* Quéro *et al.*, 1988 and *P. natalensis* Norman, 1931 in number of lateral line scales (75–78), but it can be distinguished from these species in the more-expanded profile above the upper eye; the relatively larger head (26.6–29.6% of SL), shallower body (34.9–37.3% of SL), larger upper (11.6–12.3% of SL) and lower (11.3–13.0% of SL) eye diameters, larger orbit length (11.7–13.0% of SL), and larger lower jaw length (11.4–12.5% of SL [ocular side], 11.0–12.7% [blind side]); and its fewer caudal vertebrae (28–29).
Key Words: *Poecilopsetta macrocephala*, Poecilopsettidae, Australia.

Introduction

The dextral poecilopsettid flounder genus *Poecilopsetta* Günther, 1880 is diagnosed by short pelvic fin bases with six rays, absence of a lateral line on the blind side, five autogenous hypurals lacking any fusion with the first preural centrum, absence of a tentacle on either eye, and no prolongation of dorsal and pelvic fin rays in either sex (Norman 1934; Sakamoto 1984a). Twelve species of this genus are distributed in tropical and temperate seas of the Indo-West Pacific and Western Atlantic. Ten of these are known from Indo-Pacific waters (Norman 1934, 1939; Fowler 1934; Quéro *et al.* 1988; Foroshchuk and Fedorov 1992; Hoshino 2000). A new species of this genus is described based on seven specimens captured on the continental slope off northwestern Australia.

Materials and Methods

The material of the present new species appears in the next section. Counts and measurements (binocular microscope was used to minimize the errors) follow Hubbs and Lagler (1958), but all dorsal and anal fin rays were counted individually. Osteological examinations were based on radiographs. SL and HL indicate standard length and head length, respectively. Museum codes follow Leviton *et al.* (1985).

Comparative materials. *Poecilopsetta natalensis*: BMNH 1922.3.27.7, holotype, 115.1 mm SL (female), off Natal; MNHN 1986-635–650, 16 specimens, 81.6–140.4 mm SL (eight males and eight females), off Madagascar (see Quéro *et al.* 1988 for detailed data). *Poecilopsetta vaynei*: MNHN 1986-652, paratype, 98.8 mm SL (female), off Madagascar, 12°53′S, 43°10′E, 480–520 m, 4 Mar. 1971; MNHN 1986-653, holotype, 103.0 mm SL (male), Madagascar, 25°02′S, 47°05′E, 65–70 m, 4 Mar. 1973; CSIRO B3129, three specimens, 99.4–110.0 mm SL (males), northwestern Australia, 18°11.0′S, 118°04.0′E to 18°07.0′S, 118°09.0′E, 400–404 m, 5 Feb. 1983.

Poecilopsetta macrocephala sp. nov.
(Figs 1, 2)

Material examined. *Holotype*. CSIRO H5213-01, 93.6 mm SL (female), 18°46′S, 116°19′E, 555 m, 12 Feb. 1992, demersal trawl, R/V *Surefire*, coll. by V. Wadley. *Paratypes*. CSIRO H5213-02, 97.6 (female) and 102.4 (male) mm SL, collected with holotype; CSIRO H5214-01, 97.6 mm SL (male), 18°46′S, 116°23′E, 550 m, 11 Feb. 1992, demersal trawl, R/V *Surefire*, coll. by V. Wadley; CSIRO H5215-01, 97.0 mm SL (female), 18°45′S, 116°23′E, 550 m, 10 Feb. 1992, demersal trawl, R/V *Surefire*, coll. by V. Wadley; HUMZ 164274 and 164275, 97.5–101.4 mm SL (two males), collected with CSIRO H5214-01.

Diagnosis. A species of *Poecilopsetta* with 75–78 lateral line scales, large head (26.6–29.6% of SL), well-projected profile above upper eye, shallow body (34.9–37.3% of SL), large upper (11.6–12.3% of SL) and lower (11.3–13.0% of SL) eye diameters and orbit length (11.7–13.0% of SL), large upper (8.6–9.6% of SL [ocular side], 7.7–9.0% [blind side]) and lower (11.4–12.5% of SL [ocular side], 11.0–12.7% of [blind side]) jaws, pectoral fin on ocular side smaller than that on blind side (former 63–87% of latter in length), and 28–29 caudal vertebrae.

Description. Measurements and counts are shown in Table 1. Description based on holotype, while variation in paratypes expressed in parentheses.

Head 3.38 (3.70–3.76) in SL; body depth 2.86 (2.68–2.80). Snout 8.66 (6.87–8.73) in HL; upper eye diameter 2.50 (2.07–2.31); lower eye diameter 2.37 (2.04–2.36); orbit length 2.27 (2.17–2.28); upper jaw length 3.08 (2.91–3.15) (ocular side), 3.30 (3.12–3.51) (blind side); lower jaw length 2.37 (2.17–2.36) (ocular side); 2.33 (2.20–2.45) (blind side); depth of caudal peduncle 2.66 (2.37–2.61); pectoral fin length 3.08 (2.33–3.00) (ocular side), 2.56 (1.86–2.36) (blind side); pelvic fin length 2.69 (2.26–2.51) (ocular side), 2.92 (2.43–2.73) (blind side).

Body rather elongated, compressed. Pterygiophore regions thin, semitransparent. Head large, compressed. Profile strongly projecting above and notched in front of upper eye. Snout very short, about one-third of eye diameter. Eyes large, greater

Table 1. Meristic features and measurements of *Poecilopsetta macrocephala* sp. nov. and two congeners.

	Poecilopsetta macrocephala sp. nov. (*n*=7)		*P. vaynei* (*n*=5)		*P. natalensis* (*n*=17)	
	Holotype	Paratypes	Range	(Holotype)	Range	(Holotype)
Counts						
Dorsal fin rays	65	62–66	65–67	(67)	60–65	(63)
Anal fin rays	54	53–56	56	(56)[b]	51–55	(54)
P_1 fin rays (os)*	7	7–9	8–11	(8)	8–11	(10)
(bs)**	7	7–8	7–9	(7)	7–10	(9)
Caudal fin rays	20	20	20	(20)	20	(20)
Abdominal vertebrae	10	10	10	(10)	10	(10)
Caudal vertebrae	29	28–29	30–31	(30)	30–33	(31)
Lateral line scales	78	75–77[a]	82–83[c]	(83)	71–84	(ca. 72)
Upper gill rakers	7	5–7	5–7	(6)	5–8	(5)
Lower gill rakers	11	9–11	11–12	(11)	9–11	(11)
SL (mm)	93.6	97.0–102.4	98.8–110.0	(103.0)	81.6–140.4	(115.1)
% of SL						
Head length	29.6	26.6–27.0	22.4–24.9	(24.9)	21.1–25.6	(22.7)
Body depth	34.9	35.7–37.3	38.2–39.4	(39.4)	37.5–41.7	(41.4)
Upper eye diameter	11.9	11.6–12.3	9.7–10.7	(9.7)	7.8–11.1	(8.8)
Lower eye diameter	12.5	11.3–13.0	9.6–10.8	(9.7)	8.2–10.5	(9.4)
Orbit length	13.0	11.7–12.4	9.7–10.8	(10.4)	8.6–10.8	(9.6)
Upper jaw length (os)	9.6	8.6–9.2	7.7–9.4	(9.0)	5.1–6.9	(6.0)
(bs)	9.0	7.7–8.6	6.8–8.4	(8.4)	5.2–6.8	(6.3)
Lower jaw length (os)	12.5	11.4–12.4	10.4–10.9	(10.9)	8.4–10.2	(8.6)
(bs)	12.7	11.0–12.2	10.0–10.8	(10.7)	8.2–10.1	(8.4)
P_1 length (os)	9.6	9.0–11.5	7.1–8.8	(8.8)	11.2–14.6	(11.8)
% of HL						
Snout length	11.6	11.5–14.5	13.9–18.0	(18.0)	10.7–15.5	(13.0)
Upper eye diameter	40.1	43.3–48.3	39.0–46.8	(39.1)	35.9–45.3	(38.7)
Lower eye diameter	42.2	42.3–49.0	39.1–44.4	(39.1)	37.1–48.4	(41.4)
Orbit length	44.0	43.8–46.2	39.0–44.3	(41.8)	40.4–45.3	(42.1)
Upper jaw length (os)	32.5	31.8–34.4	32.7–37.8	(36.3)	23.5–29.2	(26.4)
(bs)	30.3	28.5–32.1	29.4–34.0	(34.0)	22.4–28.0	(27.6)
Lower jaw length (os)	42.2	42.3–46.2	42.3–47.5	(43.7)	36.9–42.7	(37.9)
(bs)	43.0	40.9–45.4	42.3–47.1	(37.2)	35.3–43.0	(43.0)
Depth of caudal peduncle	37.5	38.3–42.2	45.7–54.1	(59.4)	49.0–61.3	(45.7)
P_1 length (os)	32.5	33.3–42.9	31.6–35.5	(52.1)	48.2–63.9	(35.5)
(bs)	39.0	42.7–53.8	37.8–51.2	(42.6)	43.0–52.3	(44.4)
P_2 length (os)	37.2	39.8–44.3	41.5–48.8	(41.8)	46.9–54.3	(48.7)
(bs)	34.3	36.7–41.1	39.0–41.0	(39.1)	40.2–51.6	(40.2)

* ocular side; ** blind side.

[a] Counts based on three paratypes (uncountable due to damage in other three); [b] Re-counted and corrected (55 in Quéro *et al.* 1988); [c] Based on holotype and paratype, re-counted and corrected (72–79 in Quéro *et al.* 1988). In other specimens from northwestern Australia, approximately 75, although correct number unclear due to damage.

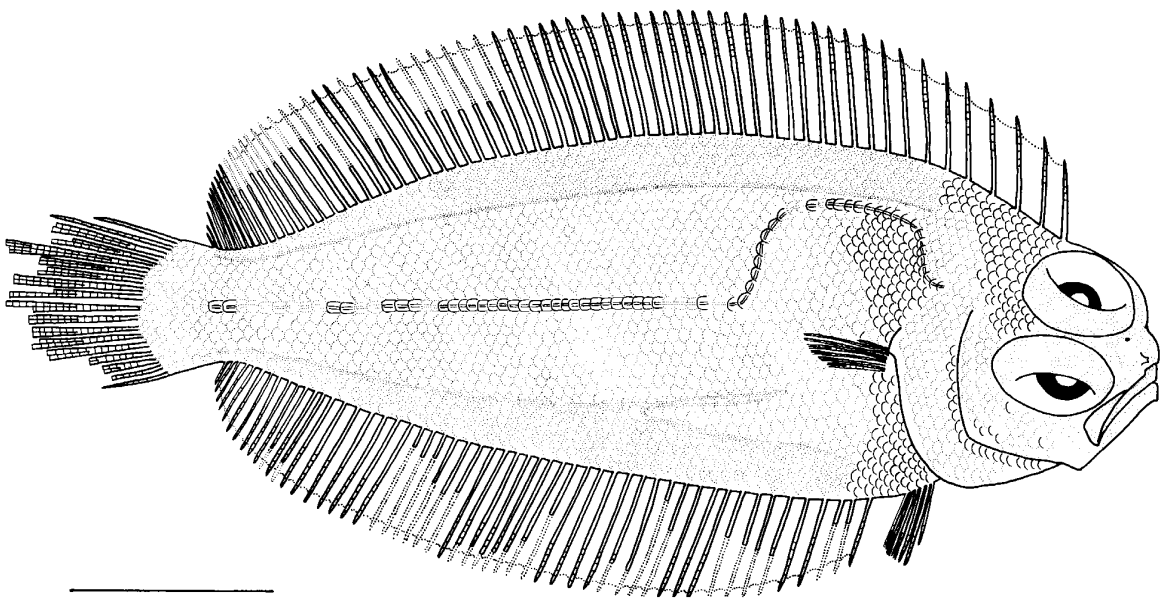


Fig. 1. *Poecilopsetta macrocephala* sp. nov., holotype, CSIRO H5213-01, 93.6 mm SL (female), northwestern Australia. Damaged fin rays and scales are restored by dotted contours. Scale indicates 20 mm.

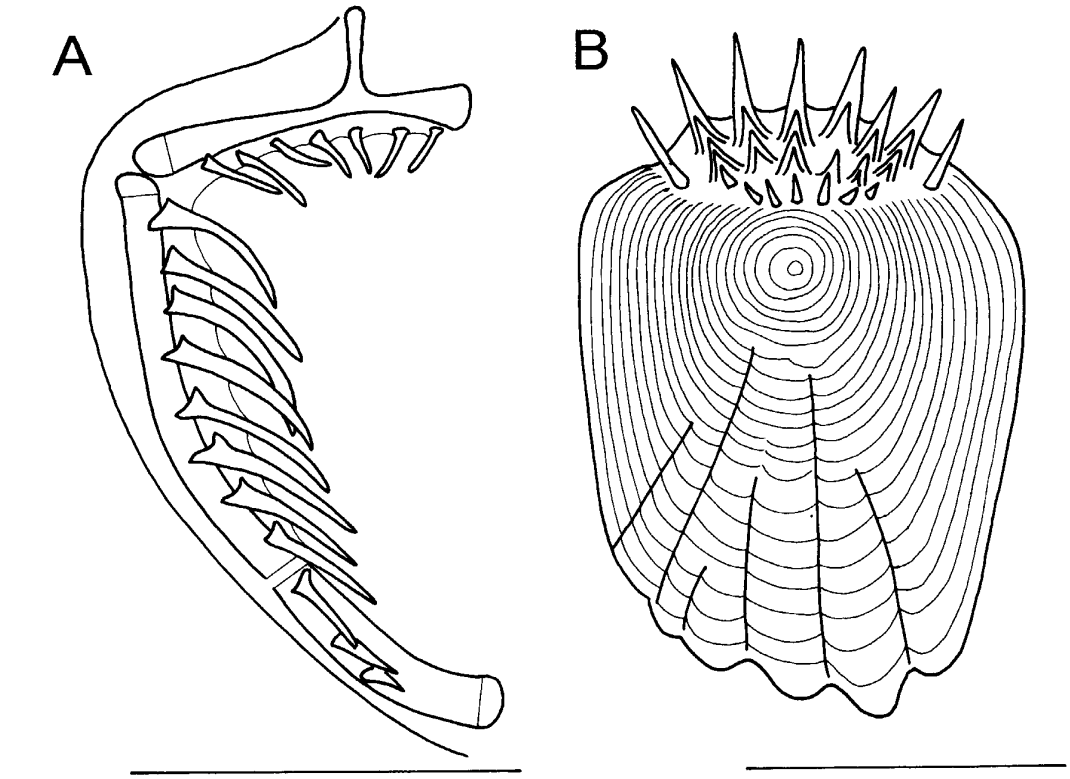
than length of upper jaw, separated by narrow bony ridge; anterior margin of upper eye slightly in advance of that of lower eye; upper eye entering dorsal profile; tentacles absent. Anterior nostril on ocular side slightly below upper margin of lower eye, opening at tip of short tube; posterior nostril on ocular side, at about level of lower margin of upper eye, with very short tube. Anterior nostril on blind side situated about level with posterior nostril on ocular side, similar in structure to its counterpart on ocular side; posterior nostril on blind side just posterior to anterior one, without tube.

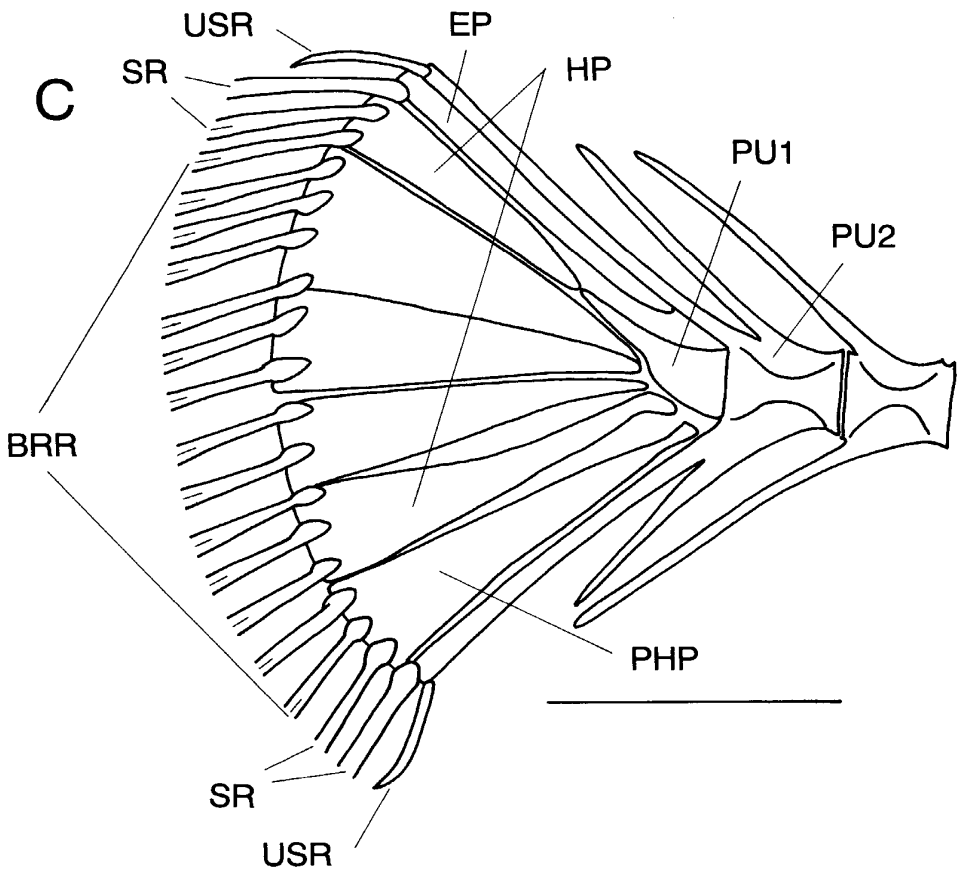
Mouth oblique, rather large, almost symmetrical on both sides. Maxilla extending to vertical line from anterior one-third of lower eye. Teeth moderate in size, sharp, present on all jaws but more developed on blind side; those on ocular side in two or three irregular rows on anteriormost part, otherwise uniserial; those on blind side in two to four irregular rows. Gill rakers slender, pointed at tips, not serrated (Fig. 2A).

Scales rather small, deciduous; those on ocular side ctenoid (Fig. 2B); cycloid on blind side. Snout, eyes, jaws, and dorsal, anal, pectoral, and pelvic fins scaleless. Caudal fins scaly proximally, naked distally. Lateral line on ocular side strongly curved above pectoral fin, no supratemporal branch; lateral line absent on blind side.

Origin of dorsal fin over posterior one-third of upper eye. All dorsal and anal

Fig. 2. *Poecilopsetta macrocephala* sp. nov. A, first gill arch from a paratype, CSIRO H5213-02, 97.6 mm SL (female), northwestern Australia; B, scale from anterodorsal part of ocular side of holotype, CSIRO H5213-01, 93.6 mm SL (female), northwestern Australia; C, caudal skeleton of holotype, drawn from radiograph. BRR, branched rays; EP, epural; HP, hypurals; PHP, parhypural; PU1, first preural centrum; PU2, second preural centrum; SR, segmented rays; USR, unsegmented ray. Scales indicate 5 mm in A and C, and 1 mm in B.





fin rays simple. Pectoral fin on ocular side small, 83% (63–87%) of its counterpart in length; four (4–5) lower rays branched on ocular side; all rays simple on blind side. Pelvic fins small, short-based, subsymmetric in length and basal length; ocular side fin slightly in advance of fin on blind side (first ray on blind side opposite to third ray on ocular side); six rays in both pelvic fins, posterior four (0–4) rays branched in ocular side fin, all rays simple in blind side fin. Caudal peduncle short. Caudal fin distally damaged in all specimens, with 20 rays, inner 14 rays branched; uppermost three and lowermost three rays simple; outermost rays small, unsegmented.

Vent almost on mid-ventral line but very slightly displaced toward blind side. Urogenital papilla shifted toward ocular side, slightly anterior to vent.

Four longitudinal series of melanophores (present as unclear spots) on both sides, distributed along dorsal and ventral margins of body and dorsal and ventral margins of body muscle. Caudal fin dusky, without apparent spots. Caudal skeleton comprising second preural centrum, first preural centrum, parhypural, five hypurals, and one epural; all elements autogenous (Fig. 2C).

Distribution. *Poecilopsetta macrocephala* is known only from the continental slope off northwestern Australia in 550–555 m depth.

Etymology. The specific name *macrocephala* comes from Greek, referring to the large head, which is diagnostic for this species.

Remarks. The present flounder can be identified as a member of the Poecilopsettidae *sensu* Chapleau and Keast (1988) (=pleuronectid subfamily Poe-

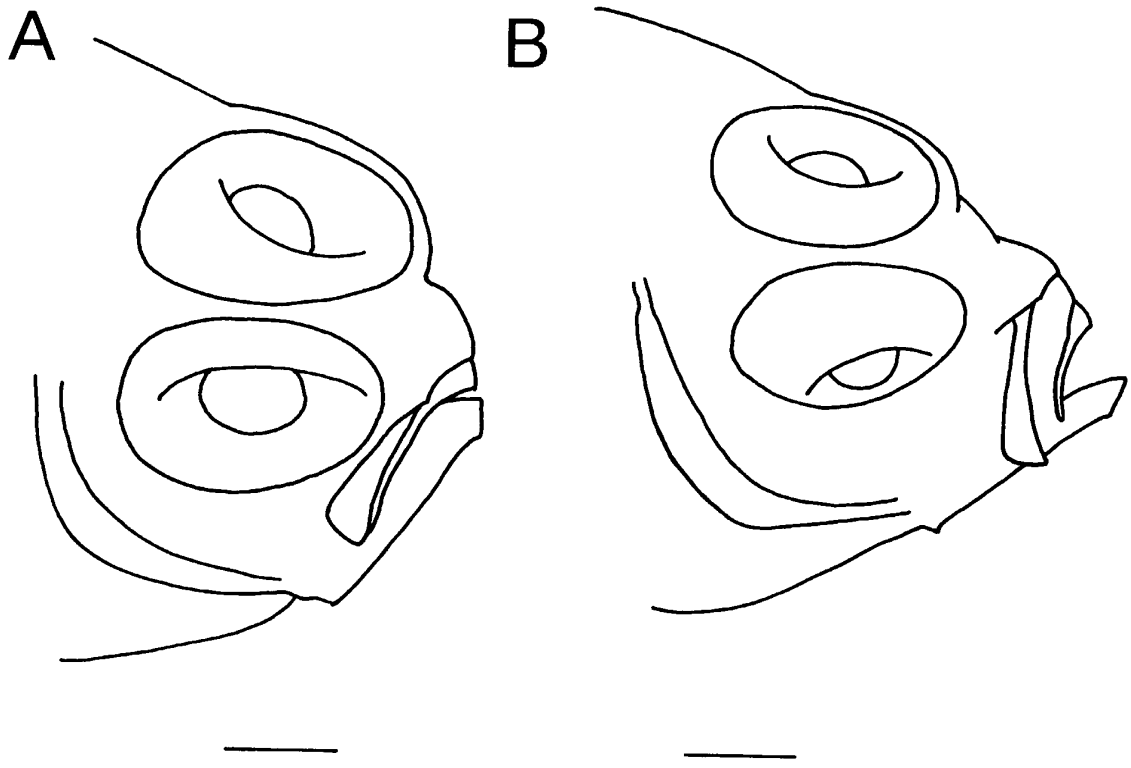


Fig. 3. Profile of two species of *Poecilopsetta*. A, *P. macrocephala* sp. nov., holotype, CSIRO H5213-01, 93.6 mm SL (female), northwestern Australia; B, *P. vaynei*, holotype, MNHN 1986-653, 103.0 mm SL (male), Madagascar. Scales indicate 5 mm.

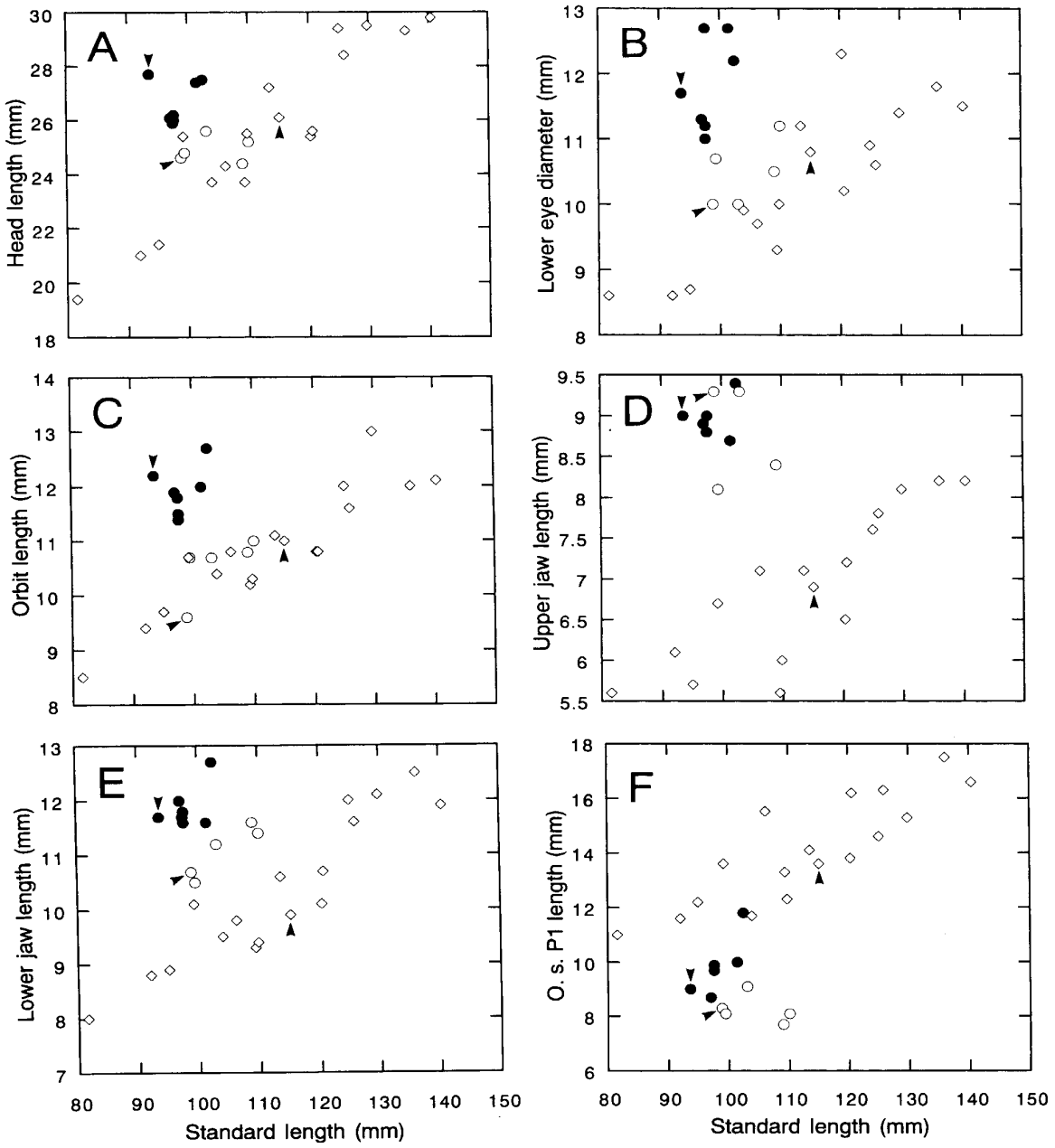


Fig. 4. Relationships for three species of *Poecilopsetta* between standard length and A, head length; B, lower eye diameter; C, orbit length; D, upper jaw length (ocular side); E, lower jaw length (blind side); F, pectoral fin length (ocular side). Black circles, *Poecilopsetta macrocephala* sp. nov.; white circles, *P. vaynei*; squares, *P. natalensis*. Arrows indicate holotypes.

cilopsettinae *sensu* Norman 1934; Hubbs 1945; Chapleau 1993) by dextral bilaterality, presence of pectoral fins on both sides of the body, lateral line developed only on the ocular side, short-based pelvic fins with six rays, and five autogenous hypurals that are not fused to the first preural centrum (Fig. 2C). The Poecilopsettidae comprise three genera: *Poecilopsetta*, *Nematops*, and *Marleyella*. Inclusion of the present species in *Poecilopsetta* is due to three diagnostic characters: absence of a tentacle on each eye (*Nematops* has either tentacles on each eye or a tentacle on the

lower eye: Norman 1934; Fowler 1934); absence of prolongations of the dorsal and pelvic fin rays in either sex (*Marleyella* has prolonged anterior dorsal and pelvic fin rays in males); and more caudal vertebrae (28–29 versus 26–27 in *Marleyella*: Norman 1934, 1939; Sakamoto 1984a).

Poecilopsetta macrocephala can be distinguished from eight of its 10 congeners distributed in the Indo-West Pacific region by the number of lateral line scales (75–78): more than those in *P. plinthus* (Jordan and Starks, 1904) (57–65: Jordan and Starks 1904; Norman 1934; Sakamoto 1984b) and *P. megalepis* Fowler, 1934 (55: Fowler 1934); and fewer than those in *P. praelonga* Alcock, 1894 (102–113: Hoshino *et al.* 2000), *P. hawaiiensis* Gilbert, 1905 (83–94: Gilbert 1905; Norman 1934; Hoshino *et al.* 2000), *P. colorata* Günther, 1880 (90–95: Norman 1934), *P. albomaculata* Norman, 1939 (ca. 140: Norman 1939), *P. zanzibarensis* Norman, 1939 (95–100: Norman 1939), and *P. normani* Foroshchuk and Fedorov, 1992 (126–147: Foroshchuk and Fedorov 1992).

The lateral line scale count (the most important character used to identify species of *Poecilopsetta*) of *P. macrocephala* (75–78) is within the ranges of those of *P. vaynei* Quéro *et al.*, 1988 (ca. 75–83: Table 1 [see footnote c]) and *P. natalensis* Norman, 1931 (71–84: Table 1). However, *P. macrocephala* can be distinguished from these species in the more-expanded profile above the upper eye (Fig. 3); the relatively larger head (26.6–29.6% of SL versus 22.4–24.9% in *P. vaynei* and 21.1–25.6% in *P. natalensis*: Fig. 4A), shallower body (34.9–37.3% of SL versus 38.2–39.4% and 37.5–41.7%, respectively), larger upper (11.6–12.3% of SL versus 9.7–10.7% and 7.8–11.1%) and lower (11.3–13.0% of SL versus 9.6–10.8% and 8.2–10.5%: Fig. 4B) eye diameters, larger orbit length (11.7–13.0% of SL versus 9.7–10.8% and 8.6–10.8%: Fig. 4C), larger lower jaw length (ocular side: 11.4–12.5% of SL versus 10.4–10.9% and 8.4–10.2%: Fig. 4E; blind side: 11.0–12.7% versus 10.0–10.8% and 8.2–10.1%); and the fewer caudal vertebrae in *P. macrocephala* (28–29 versus 30–31 and 30–33). *Poecilopsetta macrocephala* also can be distinguished from *P. natalensis* in having a shorter ocular side pectoral fin (63–87% of blind side pectoral fin length, versus 98–135% in *P. natalensis*) and a larger upper jaw (ocular side: 8.6–9.6% of SL versus 5.1–6.9%: Fig. 4D; blind side: 7.7–9.0% of SL versus 5.2–6.8%), and from *P. vaynei* by the larger ocular side pectoral fin (9.0–11.5% of SL versus 7.1–8.8%: Fig. 4F).

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References

Chapleau, F. 1993. Pleuronectiform relationships: a cladistic reassessment. Bulletin of Marine Science 52: 516–540.

Chapleau, F. and Keast, A. 1988. A phylogenetic reassessment of the monophyletic status of the family Soleidae, with comments on the suborder Soleoidei (Pisces; Pleuronectiformes). Canadian Journal of Zoology 66: 2797–2810.

Foroshchuk, V. P. and Fedorov, V. V. 1992. *Poecilopsetta normani*—a new species of flounder

(Pleuronectidae) from Saya de Malha Bank, Indian Ocean. Voprosy Ikhtiologii 32(2): 10–16. [In Russian]

Fowler, H. W. 1934. Descriptions of new fishes obtained 1907 to 1910, chiefly in the Philippine Islands and adjacent seas. Proceedings of the Academy of Natural Sciences of Philadelphia 85: 233–367.

Gilbert, C. H. 1905. The deep-sea fishes of the Hawaiian Islands. Bulletin of the United States Fish Commission 23: 577–713.

Hoshino, K. 2000. Redescription of a rare flounder, *Poecilopsetta inermis* (Breder) (Pleuronectiformes: Pleuronectidae: Poecilopsettinae), a senior synonym of *P. albomarginata* Reid, from the Caribbean Sea and tropical western Atlantic. Ichthyological Research 47: 95–100.

Hoshino, K., Amaoka, K. and Last, P. 2000. Description of transformation larvae and a juvenile of the dextral flounder, *Poecilopsetta praelonga* (Pleuronectidae, Poecilopsettinae) from the northwestern waters of Australia. Ichthyological Research 47: 263–270.

Hubbs, C. L. 1945. Phylogenetic position of the Citharidae, a family of flatfishes. Miscellaneous Publications, Museum of Zoology, University of Michigan 63: 5–38.

Hubbs, C. L. and Lagler, K. F. 1958. Fishes of the Great Lakes region. Bulletin Cranbrook Institute of Sciences 26: i–xi+1–213, pls 1–44.

Jordan, D. S. and Starks, E. C. 1904. List of fishes dredged by the steamer Albatross off the coast of Japan in the summer of 1900, with descriptions of new species and a review of the Japanese Macrouridae. Bulletin of the United States Fish Commission 22: 577–630, pls 1–8.

Leviton, A. E., Gibbs, R. H., Jr., Heal, E. and Dawson, C. E. 1985. Standards in herpetology and ichthyology: Part 1. Standard symbolic codes for institutional resource collections in herpetology and ichthyology. Copeia 1985: 802–832.

Norman, J. R. 1934. *A Systematic Monograph of the Flatfishes (Heterosomata). 1. Psettodidae, Bothidae, Pleuronectidae.* British Museum (Natural History), London, viii+459pp.

Norman, J. R. 1939. Fishes. Scientific Report, John Murray Expedition 7: 1–116.

Quéro, J. C., Hensley, D. A. and Maugé, A. L. 1988. Pleuronectidae de l'Ile de la Réunion et de Madagascar. I. *Poecilopsetta*. Cybium 12: 321–330.

Sakamoto, K. 1984a. Interrelationships of the family Pleuronectidae (Pisces: Pleuronectiformes). Memoirs of the Faculty of Fisheries, Hokkaido University 31: 95–215.

Sakamoto, K. 1984b. Family Pleuronectidae. Pp. 351–354. *In*: Masuda, H., Amaoka, K., Araga, C., Uyeno, T. and Yoshino, T. (Eds) *The Fishes of the Japanese Archipelago. Text*. Tokai University Press, Tokyo, xxii+437pp.